DEQ SAP Meeting for James River CHLa Study

19-Apr-2014, Richmond, VA

Notes on Questions to Presenters and Panel Discussion

<u>SAP Members Attending</u>: Clifton Bell, Claire Buchanan, Paul Bukaveckas, Todd Egerton, Greg Garman, Will Hunley, Rebecca LePrell, Ken Moore, Margie Mulholland, Kim Reece, Jian Shen (for Harry Wang), Peter Tango

<u>Other Participants:</u> Alex Barron (DEQ), Jamie Brunkow (JRA), Arthur Butt (DEQ), Scott Crafton (LBG), Dave Jasinski (CEC), John Kennedy (DEQ), Chris Moore (CBF), David Parrish (VIMS), Tish Robertson (DEQ), Anne Schlegel (DEQ), Ellen Snyder (Altria), Glenn Telfer (DAA), Brendan Trache (VCU), David Whitehurst (DEQ), Joe Wood (VCU)

Time	Speaker	Questions and Discussion
10:00	Paul Bukaveckas	• Will Hundley (HRSD): CHLa data associated with samples collected for phytoplankton analysis is a biased subset because these target blooms (i.e., the CHLa data are representative of the range, but do not accurately represent the mean). • Claire (ICPRB): From work in the Potomac, the estimate for CHLa losses due to grazing in the James is right on (1-15% of production) • John Kennedy (DEQ): how do you estimate downstream export of CHLa? PAB: We use USGS discharge data for the James and Appomattox Rivers CHLa concentrations measured above and below the tidal fresh segment. • Clifton Bell (B&C): Does your analysis on the fate of CHLa take into account sedimentation? PAB: Not explicitly, there is a general loss term for decomposition which includes decomposition occurring both in the water column and in the sediments. Our prior work suggests that about 60% of respiration occurs in the sediments • Kenneth Moore: You have to consider what is not protective of resources in the system. So what proportion of the system is exposed to these criteria? I know that is different in the upper James but in lower James it is highly variable spatially. • Paul Bukaveckas (VCU): You might develop a plot which relates frequency of exceedence for a given CHLa concentration to proportion of area that is affected. • Kenneth (VIMS): Yes Tish and I have done that. In 2013 and we need to consider the assessment method. • John Kennedy (DEQ): We are currently using a 6-year data window for other parameters, but for CHLa we are using a 3-year assessment. • Tish (DEQ): The CFD has issues, but we got here because this is what we used for DO. • Kenneth (VIMS): with regard to uncertainty, in order to be protective you would have to change the standard quite a bit. The standard should be tied to the monitoring approach. • Peter Tango (CBP): there are few issues with these discussions. With the discussion of the method: this plays into the reference curve element. The combination of duration, number and reference curve needs to be considered. There are lessons from the DO work that can be used. • John K.: In This case we have the monitoring tied to standard. We rely on the EPA technical support document associated with the standards that were adopted.

		• Claire (): the big driver of uncertainty in DO is the diel change which is very large, but this isn't true of CHLa.
		• Margie Mulholland (ODU): I'd argue in the lower James that is not the case.
		• John K.: when we established these standards we didn't have a critical period, if we nailed that issue down that may help. We basically honed in on seasonality and partitioning of the river by salinity regime.
		• Margie: for the upper James you can get away with it because there is not as much normality. In the lower James there needs to be a critical assessment. Where you see the blooms manifest may not have any influence of this.
		• Arthur Butt (DEQ); I'd like to thank Paul for presenting this piece. With DO there is a clear line for impairment but for CHLa that may not necessarily be the case. Keep that in mind as we go forward.
11:00	D. Jasinski & J. Shen	• Arthur: in light of what John was saying we still don't have a critical condition despite a very hard look.
		• Clifton; what we did before was the worst condition within the monitoring became the critical condition.
		• Kenneth: would you describe critical conditions
		• John K: We've considered low flow conditions, In the bay it has been spawning grounds, If you don't have that sometimes you draw a 90% line based on observation and use that.
		• Kenneth: So how do you do that with the model?
		• John K: It was really more data analysis.
		• Peter: We want to look at the extremes.
		• John K: we didn't have a lot of observations of low DO in our previous project. For CHLa we didn't have an indication of CHLa critical period and we were trying to draw a line from a lot of complicated studies.
		• John K: We are going to have a more refined water quality model than the bay program. So for that we need to be thinking about the peer-review of the modeling. We think it is going to be a better product but I wasn't aware we were going to have a stand alone watershed model.
		• Arthur: It is stand alone because of some data we have, but this is what the CB TMDL is hoping to accomplish. John K: So will this be a plug and Play Model? Arthur: Not "plug & play" WSM provides loadings as input files to the water quality model with the hydrodynamics move the water based on flows and other physical forces (tides, winds, precip.). We are meeting with them regularly so I think we are on the same page. Tetratech is also their modeler so there is consistency.
		• Kenneth Moore: To what level will this occur?
		• Jian Shen: It is much more refined in the lower James
		• Kenneth Moore: it is going to have to be, because you have all these smaller tributaries effecting what is coming in.
		• Peter Tango: What is the standard for looking at the data → we are unsure
		• Arthur: one thing you touched upon, normally you are developing models with a few data points. This has changed because of the Dataflow-you have too many data. So how do you handle this new problem. While the model output and the observations are never going to line up one-to-one, the modelers are developing tools to address this issue. I was happy to see what Jian Shen is doing with temp and salinity, b/c if they aren't getting that right nothing is going to work. I think people are going to be

		impressed with this and try to emulate it.
		• Clifton: in terms of grazing rates and some of the thing coming out of Paul's work, with all that do you think there is enough information for you to incorporate.
		• Jian (VIMS): Paul's data will certainly be useful in terms of grazers as well as Production and respiration. C:CHLa ratios are another concern because they vary widely and we model C and then convert. In the lower James this relates to light.
		• Jian; having more data makes modeling difficult and when the model fails sometimes it is modeling issue and sometimes we just don't understand the mechanism. So hopefully we will get some feedback.
12:15	Rebecca LePrell & Alex Barron	• Kenneth Moore: Is the no deaths due to acute? There have been animal mortalities.
		• John Kennedy: Have you issued warnings for toxic blooms in the past? Yes in the Potomac we have.
		• Peter Tango: Vermont and Massachusetts have similar standards.
		• Kenneth: would sub-lethal be protective as well?
		• Is that weight for crabs accurate? 18 crabs for 1 pound seems like a lot.
		• Rebecca (VDH): we do consider the weight.
		• Kim Reece (VIMS): what about soft shell? Alex: We think that is the ones who referred to eating it some of the time
		• Kenneth; why not just say you can eat X number of crabs per day?
		• Joe Wood (VCU): I think it is important to consider that all these crabs were collected during periods below 1.5 ug L of Microcystin. If we incurred Microcystin concentration similar to what Rebecca suggested would be impaired I don't think we can exclude the possibility of Crab consumption as a mechanism of microcystin exposure.
		• Kenneth: So how long does it take for crabs to accumulate Microcystin
		• Peter: Could a literature review be performed on MC in crabs at different water Levels? Paul, there are only 2 papers published that relate to this (ours is the second).
1:00	Arthur Butt & Tish Robertson	• Ken Moore; So what does the distribution actually look like? It can be very messy.
		• Ken Moore: Are there segments or area within segments that are representative? We have found that with the Bay Program.
		• John K: the possibility of a final assessment grid is something we can look at. While I think that is something we could do, and would yield positive results. We've been asking if we can have partial de-listings when you see exceedance only in a small area, or do meet one or some of the multiple DO criteria, if not all.
		• Jian Shen: so in Spring the criteria failed but not in the summer
		• Todd: So even in the spring of 2012 the criteria was met? 2010 is actually the data for the 2012 report
		• Tish: The purpose of the assessment is to get an ambient characterization, so the longer you go the less sensitive you get to "bad years".
		• Kenneth Moore: Do you set a standard based on the uncertainty?
		• Tish: we think the standard should be set on the scientific data, like a speed limit.
		• John K: the standard should be set based upon the science, and it shouldn't really consider cost to fix things. If necessary, that's why a Use Attainability would be performed. We are trying to develop more advanced assessments rather that just binary yes/no compliance with standards; looking at incremental improvements.
		• John K: at the risk of over-simplification, the point of this study is what should those CHLa standards be based on more science. We think the assessment criteria works for the most part.

		• Kenneth: so how do you assess progress? Tish: we can de-list by segments. • John K: Incremental improvements. We could look at max observed values, percent exceedance. We didn't fail as badly. Typically we only report pass / fail and I'm not sure how deeply people look into this besides pass/fail. • Claire; looking at that page, there are multiple impairments. How does Virginia prioritize? • John K; The way the river allocations were set were to meet ALL Criteria.
1:45	Anne Schlegel	• John K: Is there another step to move from Microcystis to Microcystin? Paul: Yes, other forms of cyanobacteria (besides Microcystis) can produce the toxin, and not algae thasn can produce the toxin, do not always do so. Our data show that cyanobacteria blooms occur throughout the summer but it is the late-season blooms that are associated with toxin production. • Clifton: Some of us were talking about additional probability approaches. Thresholds at which you are more likely to see some of these species. Anne: Yes I think that is a good Idea. • Peter Tango: I think there is a lot of history of data for this species. There might be some data from the Bay that has some of those uncommon species that could be used for CHLa relationships. • Will Hundley: So are Cochlodinium densities related to CHLa at high levels? This seems to be a good way to go for the standard. • Will: Would you like us to work with you on a probability approach? I think there is enough data to take a shot at it. • Paul: in the tidal fresh Cyanobacteria is only about 10% of biomass. You may want to consider other types of cyanobacteria even though we don't see them In the James. Others may not produce microcystin but contribute in other ways to poor food quality for consumers. There has been a large number of studies on Lakes with regard to this. • Peter Tango: There is a nice study from the 70s or 80s that illustrates the issues with cyanobacteria. • Todd Egerton (ODU): the data I submitted has proportion cyanobacteria. • Paul: most people study Microcystis in systems where it dominates whereas this system they are not the most abundant. • Kenneth Moore: weren't you (Paul) trying to asses other types of cyanobacteria. • Paul: We have monitored Phycocyanin which has been very helpful but doesn't always correspond with toxin producers. • Arthur: Before we start thinking about interesting studies we have to think about our current problem. You all have to come up with a recommendation a year from now to pass onto the modelers about what criteria are protective. • Clifton: are you looking for proposals to actually assess what to do with this data. Are you planning a more frequent working group? • John K: I think what you are talking about is a regulatory advisory panel. • Arthur: Are we at that stage yet? John probably not for another year. Arthur: we have a few proposals in. • Paul: are you referring to proposals for data analysis or proposals for data review? • Arthur: It could be both. • Peter: It sounds like you need a meeting in the next 3-6 month to assess these things. • John K: What would be the product that comes out of this for the Regulatory Advisory Panel to deal with. It's probably premature to develop the "RAP".

| | | Hopefully a year from now we have some consensus on the data we have collected. I'm still not convinced we are at the stage to suggest weather there is a human health or aquatic life designated use. I'm not sure I know which way the standards are going to go and don't want to predict that. We didn't have pre-conceived notions of what we wanted to do. Arthur: I think we need to pull out the pencil and say with what we have, what we are missing. We have a lot of papers and we need to pull those together and determineif the current chl criteriaare or are not protective of the aquatic life and where we are unsure. Clifton: I think we should have a working group for those interested to decide what we should do. I'm worried things will not coalesce. Paul: perhaps we need a work plan for data analysis. Echoes of "that makes a lot of sense". John K: it is incumbent on the state to take the results and decide what to do. We don't have the horsepower or the brainpower to do all the monitoring, modeling and evaluation of results on our own, but we are not expecting to be spoon-fed. Arthur: in light of such a work plan for data analysis, how soon could we pull together such a work group? Would that be part of a funding project? There are proposals in now but we don't know how to spend the money. How soon can we do this? John K: why don't you call for volunteers? Kenneth: I think we should come up with a list of things we need Peter: Can we just put everybody's work into a table at different CHLa levels. John K: how many outstanding reports are there? 5 When were they due? March of last year and April of this year. John K: As far as further funding for Data analysis we could possibly look into this. Kenneth: it seems like there are several thing included initially that are being discussed like what should be done about this. John & Rusty: that all falls under the WIP which is separate. Kenneth: I think if we focus our questions that would be helpful. Arthur: PIs get your reports in. Next thing is pull together a working work group for data analysis. We're going to have to get together a work group in a couple weeks. Paul: that won't happen. Arthur: well how long will it take: I'm not sure but that is why I suggested you should not tie this to data collection. Clifton: Well perhaps the first meeting shall include just a time table. Arthur: So who is interested? Paul, Clifton, Peter, Will, Claire, Todd, Margie, |